

Attorney Docket No. P118-US

REMARKS

Claims 1-3, 5-21, 24-64, 66-73, 79, and 80 are pending. With this amendment, claims 1, 26, 30, 32, 40, 42, 44, 48, 49, 53, 56-58, 60, 61, and 66 are amended. Claims 31, 55, 72, 73, 79, and 80 are canceled.

Claims 26, 48, 49, and 66 are amended to remove informalities thereof. Withdrawal of rejections to these claims under 112 2nd paragraph is respectfully requested. Claims 56-58, 60, and 61 are amended to maintain correct dependencies after cancellation of claim 55. Claims 32, 40, 42, and 44 are amended to maintain correct dependencies after cancellation of claim 31.

Rejection of independent claim 1

Independent claim 1 was rejected in the Office Action under 102(b) as being anticipated by Lebouitz (US 2002/0033229). The undersigned respectfully submits that claim 1 as amended is not disclosed or suggested by Lebouitz.

Specifically, claim 1 now expressly recites, among other features, the steps of providing a spontaneous vapor phase etchant recipe to the etch system so as to etch the sacrificial material; and measuring an amount of a chemical species in the process; determining a feeding time based on the measurement; and further etching the sacrificial material by providing an additional amount of the spontaneous vapor phase etchant recipe to the etch system based on the determined feeding time to continue the process. These features are nowhere disclosed or suggested by Lebouitz.

Lebouitz describes the step of "determining that an etching process taking place in the etching chamber is complete" (paragraph [0013], which "may include determining that a predetermined etch time has elapsed..."); the determined time in Lebouitz is a time when the etching process is complete. It is distinct to what is recited in claim 1 of this application where the feeding time (for feeding the additional amount of the spontaneous vapor phase etchant recipe) is determined.

It is noted that the step of measuring an amount of a chemical species could be used for determining the endpoint of the etching process; however, it is not the subject matter of the invention set forth in claim 1 of this application. An example of endpoint detection based on measuring a chemical species in the process is set forth in co-pending US patent application serial number 10/269,149 filed October 10, 2002.

Because Lebouitz fails in teaching or suggesting all features of claim 1, claim 1, as well as claims 2-3, 5-21, and 24-29 that are dependent from claim 1, is patentable over Lebouitz. Reconsideration and withdrawal of the rejection of the claims are respectfully requested.

Attorney Docket No. P118-US

Rejection of claim 30

Independent claim 30 was rejected under 102(b) over Lebouitz. This rejection is respectfully traversed. However, claim 30 is amended so as to place claim 30 in a better form for examination.

Claim 30 expressly recites, among other features, wherein at a first time the etchant recipe is provided at a first amount per unit time, and wherein at a second time the etchant recipe is provided at a second amount per unit time that is a different from the first amount per unit time. This feature is nowhere disclosed or suggested by Lebouitz.

In contrast, Lebouitz discloses, for example, in paragraph [0038] that the "The system parameters to be chosen by the user include one or more of: xenon difluoride to nitrogen gas ratio, etch time, etch pressure, and number of cycles;" and "The precise values for each of these parameters is dependent on and will thus vary with the nature of the sample to be etched and may be chosen by one of skill in the art." It is interpreted by the undersigned that those parameters are potentially variable in the sense to be determined based on the specific samples to be etched; and the parameters are set at the initiation of the etching process (see paragraphs [0039] to [0044]). Lebouitz, however, does not teach or suggest the feature wherein at a first time the etchant recipe is provided at a first amount per unit time, and wherein at a second time the etchant recipe is provided at a second amount per unit time that is a different from the first amount per unit time, as recited expressly in claim 30.

Because Lebouitz fails in teaching or suggesting all features of claim 30, claim 30, as well as claims 31-52 depending from claim 30, is patentable over Lebouitz. Reconsideration and withdrawal of the rejection are respectfully requested.

Rejection of independent claim 53

With respect to the Examiner's rejection of claim 53 under 102(b) over Lebouitz, this rejection is respectfully traversed.

Claim 53 as amended expressly recites, among other features, the step of providing an etchant recipe to the etch chamber over time, wherein an amount of the etchant is varied when a change of a measured parameter is beyond a predetermined value during the etching, and wherein the amount of the etchant is varied from a first amount to a second amount and wherein both the first and second amounts are not 0. This feature is nowhere disclosed or suggested by Lebouitz.

In contrast, Lebouitz discloses, for example, in paragraph [0038] that the precise values for each of those parameters, which include one or more of: xenon difluoride to nitrogen gas ratio, etch time, etch pressure, and number of cycles, is dependent on and will thus vary with the nature of the sample to be etched and may be chosen by one of the skilled in the art. These parameters are potentially variable from

Attorney Docket No. P118-US

sample to sample based on the type of sample but not during the etching process of the same sample (see paragraphs [0039] to [0044]). Lebouitz also discloses determining an endpoint of the etch – if this ending of the etch were determined to be a “variation” of the amount of the etchant, claim 53 as amended makes clear that the first and second amounts are non-zero. Lebouitz, therefore, does not teach or suggest the amount of the etchant being varied when a change of a measured parameter is beyond a predetermined value during the etching (and wherein the amount of the etchant is varied from a first amount to a second amount and wherein both the first and second amounts are not 0), as recited expressly in claim 53.

Because Lebouitz fails in teaching or suggesting all features of claim 53, claim 53, as well as claims 54-62 depending from claim 53, is patentable over Lebouitz. Reconsideration and withdrawal of the rejection are respectfully requested.

Rejection of independent claim 63

Independent claim 63 was rejected in the Office Action under 103(a) as being obvious over Lebouitz in view of Winningham (US 6,518,194). This rejection is respectfully traversed.

Claim 63 expressly recites, among other features, the step of etching the second microstructure in the second etching process using the etchant recipe based on the collected data of the parameter in the first etching process. Lebouitz does not disclose or suggest this feature, as indicated by the Examiner. The Examiner states that the deficiency in Tai is remedied by Winningham. The undersigned respectfully submits that there is no motivation to combine Lebouitz and Winningham. Lebouitz is related to gas phase silicon etching with XeF_2 , while Winningham is related to etching Cr coated bionanomasks applied directly to a silicon substrate using H_2 and SF_6 as etchant – two completely different processes and products.

Even forced to combine the two references, Winningham does not remedy the deficiency of Lebouitz. More particularly, the combination of Lebouitz and Winningham does not teach or suggest the step of determining a variation profile of the parameter in the first etch process, as expressly recited in claim 63.

Because Lebouitz and Winningham, either individually or in combination, do not disclose or suggest all features of claim 63, claim 63, as well as claims 64 and 66-71 that are dependent from claim 63, is patentable over Lebouitz and Winningham. Reconsideration and withdrawal of the rejection are respectfully requested.

Rejection of independent claim 72

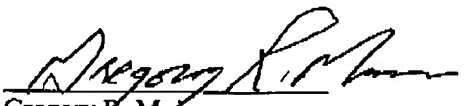
Attorney Docket No. P118-US

Claims 72, 73, 79, and 80 are canceled in this amendment in favor of the prosecution of the remaining pending claims. Withdrawal of the rejection to these claims is respectfully requested.

It is believed that this application is in condition for allowance. Favorable consideration and prompt allowance are respectfully requested. In the event any fees are required in connection with this paper, please charge our Deposit Account No. 501516.

Respectfully submitted,

REFLECTIVITY, INC.
350 Potrero
Sunnyvale, CA 95054
Fax: (408) 737-8153



Gregory R. Muir
Attorney for Applicants,
Registration No. 35,293
Tel: (408) 737-8100